

Reply to Attn of: **LX:239-11**

**August 8, 1983**

**Dr. Joshua Lederberg**  
1431 Pitman Avenue  
Palo Alto, CA 94301

**Dear Dr. Lederberg:**

Enclosed are copies of some articles that you may find useful as background material in writing a preface for the "Cosmic History" report. I will be glad to try to answer any questions you may have about these papers.

1. Wolman et al. (1972) compare amino acids found in Murchison<sup>on</sup> meteorite with those produced in a Miller-Urey experiment. The qualitative similarities in composition are interesting and most likely coincidental.
2. Miller et al. (1976) discuss the origin of organic matter in meteorites, but they disregard any interstellar sources.
3. Bunch and Chang (1980) consider briefly the organic chemistry of meteorites in the context of evidence for low temperature hydrothermal activity on the parent bodies. The processes that produced clays may also have synthesized organic compounds or altered a pre-existing (interstellar ~ cometary) assemblage.
4. Lewis and Anders (1983) summarize the evidence in meteorites for noble gases and carbonaceous grains of interstellar origin. The connection between the least chemically active elements and the most chemically versatile is especially intriguing and probably diagnostic of the source regions and production mechanisms for these elements.
5. Chang et al. (1983?) provides a recent review of the status of prebiotic organic synthesis in light of developments in planetology. A shorter version for geophysicists' consumption is also included.
- 6-8. Articles by Cairns-Smith, A. Weiss and H. Hartman provide an alternative scenario for the origin of life that focuses on the initial importance of inorganic rather than organic chemistry.

On behalf of the Extraterrestrial Research Division I would like to extend an open invitation to you to visit us. We will accommodate your visit on any day that you find convenient during your stay in Palo Alto. Just drop me a note or call me at (415) 965-6206, and I will make the arrangements.

Sincerely,

A handwritten signature in cursive script, reading "Sherwood Chang". The signature is fluid and elegant, with a long horizontal flourish extending from the end of the name.

Sherwood Chang  
Assistant Chief for Science and Technology  
Extraterrestrial Research Division

Enclosures